

## Claims

1. A method for fabricating a nanoscale or atomic scale device, comprising the  
5 steps of:
  - creating one or more registration markers visible to a Scanning Tunnelling  
Microscope (STM), Scanning Electron Microscope (SEM) or an optical microscope, on  
or in a (clean) silicon surface;
  - using a SEM or optical microscope to form an image of at least one of the  
10 registration markers and the tip of a Scanning tunnelling Microscope (STM) in the  
vicinity of the registration marker;
  - using the image to position and reposition the STM tip relative to the marker  
with nanometre or micron resolution in order to pattern the active region of the device  
structure on the silicon surface;
  - 15 forming the device and then encapsulating it with silicon such that one or more  
of the registration markers are still visible on the silicon surface to a SEM or optical  
microscope;
  - depositing a metal layer onto the silicon surface using either optical or electron  
beam lithography to form one or more ohmic or gate electrodes, or both, at one or more  
20 locations positioned relative to respective registration markers.
2. A method according to claim 1, wherein the silicon surface is the (100)-oriented  
surface having a 2x1 unit cell surface structure with rows of  $\sigma$ -bonded silicon dimers.
3. A method according to claim 1 or 2, wherein the silicon surface is up to 1cm<sup>2</sup> in  
size.
- 25 4. A method according to any preceding claim, wherein the registration markers are  
defined by optical or e-beam lithography (EBL).
5. A method according to any preceding claim, wherein the registration markers are  
created using focussed ion beam (FIB) milling or etching of the silicon surface.
6. A method according to any one of claims 1 to 4, wherein the registration  
30 markers are created using wet-chemical etching or reactive ion etching (RIE).
7. A method according to any one of claims 1 to 4, wherein the registration  
markers are created by depositing metal onto the silicon surface.
8. A method according to any preceding claim, wherein the markers are sized  
between a few nm and several microns.